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Mental Efficacy and Physical Efficacy at the Team Level: Inputs and Outcomes Among Newly Formed Action Teams

Robert R. Hirschfeld
University of Colorado at Colorado Springs

Jeremy B. Bernerth
University of South Alabama

The authors demarcated mental efficacy and physical efficacy at the team level, and they explored these 2 factors as outcomes of 4 potential inputs and as predictors of 3 outcomes among 110 newly formed action teams in a military setting. Both types of team efficacy benefited from greater team size and an initial experience of enactive mastery, but they were not influenced by teams' female representation or knowledge pool. In terms of predictive contributions, both mental and physical efficacy facilitated internal social cohesion, yet only mental efficacy promoted problem solving and observed teamwork effectiveness.

Keywords: collective efficacy, group potency, teamwork, team effectiveness, team performance

Interdependency among members in pursuing collective performance objectives is a defining characteristic of any real team (Cordery, 2003; Hackman, 2002; Levi, 2001). Yet, it also has implications for the nature of capability beliefs at the team level. Although team-level capability beliefs originate with individual team members, they are amplified by interpersonal interactions and ultimately emerge as collective phenomena (see Gibson, 1999, 2001; Kozlowski & Klein, 2000). In forming team-level capability beliefs, team members collectively consider the personal resources in the team and the potential of the team to integrate its resources by means of internal collaboration (Zaccaro, Blair, Peterson, & Zazanis, 1995). Having established confidence in its capabilities, a team then has a collective mindset to work in an orchestrated fashion and use its resources well for accomplishing challenging tasks (Gully, Incalcaterra, Joshi, & Beaubien, 2002; Lester, Meglino, & Korsgaard, 2002; Zaccaro et al., 1995).

We focused our research on the capability beliefs of *action teams*; these teams are designed to have team–member interdependence across different tasks. In general, action teams exist to not only make decisions but also to take action such that they physically manipulate their operating environment to carry out their plans (see Chen, Thomas, & Wallace, 2005; Marks, Zaccaro, & Mathieu, 2000). Examples of action teams include sports teams, military combat teams, search/rescue teams, flight crews, surgery teams, and musical groups (Chen et al., 2005; Sundstrom, De Meuse, & Futrell, 1990). We submit that the categories of *mental* and *physical* essentially summarize the "key task domains" (see Gibson & Earley, 2007, p. 451) of action teams, and we propose that these two categories would likewise be useful for framing the basic capability beliefs of action teams.

In delineating team-level capability beliefs, researchers have used frames of reference that are task-specific or task-general (Gully et al., 2002; Lee, Tinsley, & Bobko, 2002). As a task-specific belief, *team efficacy* is a team's perception of its capability to perform well on a given task (Gully et al., 2002; Lee et al., 2002; Knight, Durham, & Locke, 2001; Zaccaro et al., 1995). As a task-general belief, *team potency* is a team's perception of its capability to perform well across various tasks (Gully et al., 2002; Guzzo, Yost, Campbell, & Shea, 1993; Lee et al., 2002). For the present study, we took a unique approach by demarcating two types of team efficacy. In particular, we investigated the mental efficacy and physical efficacy of newly formed action teams as outcomes of four inputs (the size, female representation, knowledge pool, and initial performance of teams) and as predictors of team proficiency (on three types of tasks), internal social cohesion, and observed teamwork effectiveness.

Mental and Physical Efficacy Among Action Teams

The term *mental* refers to cognitive processes (i.e., cognition) involved in objective events, "such as perceiving, conceiving, remembering, reasoning, judging, imagining, and problem solving" (VandenBos, 2007, p. 187). Accordingly, we conceptualize *team mental efficacy* as a team's belief in its capabilities to solve challenging problems and to make good decisions. In contrast to mental, *physical* usually refers to readily observable actions that reflect concerted effort in response to external demands. In light of what is implied specifically by physical performance in occupational settings (see Hogan, 1991), we designate *team physical efficacy* as a team's belief in its capabilities to perform well in comprehensive physical tasks involving muscular strength, cardiovascular–muscular endurance, and movement quality.

Robert R. Hirschfeld, Department of Management and Quantitative Methods, University of Colorado at Colorado Springs; Jeremy B. Bernerth, Department of Management, University of South Alabama.

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Correspondence concerning this article should be addressed to Robert R. Hirschfeld, Department of Management and Quantitative Methods, College of Business and Administration, University of Colorado at Colorado Springs, 1420 Austin Bluffs Parkway, Colorado Springs, CO 80933-7150. E-mail: rrhirschfeld@gmail.com

Each efficacy belief should arise in part from team attributes that signal relevant abilities of team members, how well the team can use those abilities, or both (Zaccaro et al., 1995). Hackman (2002) identified the number, mix, and knowledge of team members as team attributes having pertinent ramifications. We examined three corresponding team attributes—namely, team size, female representation, and knowledge pool. Admittedly, these inputs provide only indirect information about a team's capability to perform well. Therefore, we also investigated initial team performance, as an input, on the basis that the actual experience of performing provides direct information on capabilities (Lester et al., 2002; Zaccaro et al., 1995).

Inputs to the Two Types of Team Efficacy

Team size. Greater team size represents a potential paradox for team functioning (Guzzo et al., 1993; Hackman, 2002; Kozlowski & Bell, 2003; Zaccaro et al., 1995). On one hand, it might impair team efficacy because the presence of more members could decrease opportunities for individual members to contribute and also could make coordination among teammates more difficult (Kerr, 1989; Rentsch & Klimoski, 2001; Zaccaro et al., 1995). Alternatively, larger teams may be seen as having more personnel resources (Kozlowski & Bell, 2003; Zaccaro et al., 1995). Although both of these propositions are plausible, an ideal team size may depend on the nature or array of team endeavors (Hackman, 1987). To the extent that action teams face assorted challenges, there is ample opportunity for individual members to contribute in different ways. As such, we propose that the presence of more members within action teams would be equated primarily with greater resources for both solving problems and physically accomplishing tasks.

> *Hypothesis 1:* Team mental efficacy and physical efficacy will be greater in teams with more members.

Female representation. When physical strength and endurance are emphasized in a traditionally male-dominated setting, greater female representation may impair team physical efficacy. For example, when physical strength and endurance are especially salient, team members could view greater female representation as disadvantageous insofar as women, on average, possess less of these abilities (see Arvey, Landon, Nutting, & Maxwell, 1992; Hough, Oswald, & Ployhart, 2001; Sackett & Wilk, 1994). Also, gender–role congruence theory suggests that greater female representation could be seen as incongruent with the *agentic* (assertive, forceful, strong, tough; i.e., masculine) behavior often associated with the most intense displays of physical exertion in a traditionally male-dominated environment (see Carli & Eagly, 1999; Cleveland, Stockdale, & Murphy, 2000; Powell & Graves, 2003).

> *Hypothesis 2:* When physical strength and endurance are emphasized in a traditionally male-dominated setting, team physical efficacy will be less for teams with greater female representation.

Team knowledge pool. A team knowledge pool represents the additive aggregation of team members' knowledge to the team level (e.g., Austin, 2003; Hirschfeld, Jordan, Feild, Giles, & Armenakis, 2006), and it should be a basis for building team-level efficacy (Mathieu & Schulze, 2006). That is, knowledgeable team members would together deem that they have the means to assimilate information and to figure out how to work well together in tackling any type of challenging task, which should result in a shared sense of generalized competence. Therefore, we propose that a greater knowledge pool within a team benefits both types of team efficacy.

> *Hypothesis 3:* Team mental efficacy and physical efficacy will be greater for teams with a greater knowledge pool.

The actual experience of performing provides clear diagnostic information to a team about its capabilities for ensuing tasks (Lester et al., 2002; Zaccaro et al., 1995). For instance, when a team performs well in a challenging endeavor, it will likely experience a true sense of efficacy (Bandura, 1997). It follows that for shaping a team's capability beliefs, initial performance should complement indirect sources of capability information (i.e., team attributes).

> *Hypothesis 4:* Team mental efficacy and physical efficacy will be greater for teams that have performed well in the initial stage of a mentally and physically imposing endeavor.

Outcomes of the Two Types of Team Efficacy

Relevant theory posits that team efficacy does not merely represent its inputs but rather provides a cognition-based impetus for teams to fully use existing resources, improve future capabilities, and work toward optimal performance on other complex tasks to follow (Bandura, 1997; Zaccaro et al., 1995). By definition, team (group) problem solving entails "resolving matters that involve doubt, uncertainty, or unknown difficulties" (VandenBos, 2007, p. 421). In light of these trying conditions, collaborative efforts to solve a problem will occur only insofar as team members believe the problem can be solved and are motivated to generate a solution (Levi, 2001). We posit that team mental efficacy engenders such belief and provides motivation for team members to emphasize mutual understanding in striving to transform elusive affairs into expressions that are communicated and assimilated. In this way, team mental efficacy would shape constructive efforts among teammates to produce, transmit, and integrate a diverse array of information and ideas from which team members learn and then together formulate solutions.

> *Hypothesis 5a:* Team mental efficacy will contribute, beyond physical efficacy, to team proficiency on tasks that primarily entail problem solving and decision making.

Team proficiency on comprehensive physical tasks results from more readily discernible phenomena, such as the visibly synchronized actions and evident physical prowess of team members (LaFasto & Larson, 2001). We theorize that team physical efficacy encourages team members to fully engage themselves in contributing to a multifaceted physical pursuit so that they strive to apply their physical abilities, "pull their own weight," work at an energetic tempo, and do what they can to complement the actions of others. This type of motivation would also inspire teammates to actively manage the complexities of collective physical performance by orchestrating various physical actions, tracking detect-

able progress, and engaging in physical back-up behavior (see McIntyre & Salas, 1995). We posit that much of this ongoing physical collaboration is removed from explicit communication and that it is thereby facilitated more by team physical efficacy. An example of this implicit collaboration is maintaining awareness of teammates and physically responding to supplement their actions without a deliberate message being sent by them. Owing to the notion that team physical efficacy promotes such dynamic efforts by teammates, to fully use and integrate a team's physical abilities, team physical efficacy should promote team proficiency on tasks that pose an array of physical challenges.

> *Hypothesis 5b:* Team physical efficacy will contribute, beyond mental efficacy, to team proficiency on tasks involving comprehensive physical activity.

Bandura (1997) noted that in teams with a great deal of social cohesion, "players stick together, are united in their aspirations, and have a strong sense of collective identity" (p. 404). Whereas this internal social cohesion is experienced within a team, observed teamwork effectiveness represents the extent to which a team's actions are viewed externally as productive (synergistic) in light of team objectives (Gibson, 1999; Ilgen, 1999; Levi, 2001). We propose that team mental efficacy and physical efficacy together make unique contributions to promoting the internal social cohesion and observed teamwork of action teams. Our specific reasoning is that whereas team mental efficacy promotes portions of social cohesion and teamwork involving explicit communication, team physical efficacy promotes portions of social cohesion and teamwork involving the more implicit collaboration that takes place in synchronizing physical actions among teammates.

> *Hypothesis 6a:* Team mental efficacy and physical efficacy will make unique contributions to internal social cohesion.

> *Hypothesis 6b:* Team mental efficacy and physical efficacy will make unique contributions to observed teamwork effectiveness.

Method

Nature of Research Setting and Team Tasks

We conducted this research in a 5-week U.S. Air Force (USAF) officer development program (ODP), with participants who were USAF officers (captains) averaging 32 years of age with 6–7 years of commissioned service. The ODP involved newly formed teams that were self-regulating (Mohrman, 2003), had considerable structural interdependence (Cordery, 2003; Van der Vegt, Emans, & Van de Vliert, 2001; Wageman, 2001), and engaged in three types of tasks (described below) designed to encompass a number of complexities.

Project X encompassed a total of 14 tasks that were both mentally and physically demanding, with strict time limits for completion. The first phase (7 tasks) occurred on Monday of Week 2, and the second phase (another 7 tasks) occurred on Tuesday of Week 4. An example exercise is a team having 15 min to plan and execute a river crossing without touching the water, with only a piece of rope and board available for use.

Team problem solving entailed three mental exercises to be completed by teams within time limits, and these exercises occurred on Thursday of Week 2, Tuesday of Week 3, and Thursday of Week 4. Each exercise posed a difficult problem, involving a realistic military scenario with uncertainty, and consisted of two periods: (a) a 45-min planning period and (b) a 15-min execution period. An example is solving an enemy code by piecing together unique information possessed by different team members while complying with specific parameters.

Field operations encompassed three physical campaigns (32 min each) of two teams competing in an outdoor team sport. The three campaigns involved different competitor teams, and they occurred on three consecutive Fridays (Weeks 2–4). The sport posed a variety of physical challenges in requiring coordinated running, throwing, and catching by team members.

Procedures and Participants

So that all teams were similar in composition, participants were assigned to a team on the basis of variables such as demographic characteristics, job classifications, and military status. Each team remained intact for 5 weeks and had an assigned observer who watched his or her team during the ODP activities. At the end of the ODP and for our research only, observers were asked to evaluate the extent to which their team showed effective teamwork.

Data were collected on 110 teams ranging in size from 12 to 15 members; 85 teams (77%) had 14 members, and 17 teams (15.5%) had 13 members. The number of women per team ranged from 0 to 4 (only one team had no female members), with 103 of the 110 teams (94%) having either 2 or 3 women. The proportion of team that was female ranged from 0% to 29%, for an average of 17% per team. Notably, 85% of the teams were within the range of 14%–21% female.

We had to work around a tight ODP schedule and to use dates on which the many participants could be surveyed with minimal interruption. As a result, we administered the survey of *team mental efficacy* and *team physical efficacy* in the middle of Week 2. Prior to this date, teams had completed a teambuilding session, undergone three sessions of physical conditioning, practiced a field operations campaign, and performed the first phase of *Project X.* Nevertheless, Project X was not completed until Week 4, and *team problem solving* and *field operations* competition did not begin until the end of Week 2. As such, the majority of episodes on which team proficiency was measured occurred after team efficacy was assessed. In addition, *teamwork knowledge* was assessed at the end of Week 2. We administered the survey of team *internal social cohesion* at the beginning of Week 5, and we obtained matched surveys from 73% of ODP participants. After the completion of Week 5, observers assessed the *teamwork effectiveness* of their teams.

Measures of Team Efficacy and Internal Social Cohesion

Two types of team efficacy. To maintain an identical format across the two measures of team efficacy, we used seven of eight items from Guzzo et al. (1993) as the basis for each efficacy measure. The item we excluded as a source for our measures was "My team expects to have a lot of influence around here." We excluded this item because such influence on the broader organizational environment was deemed, by ODP

administrators, to be out of place. For both measures of team efficacy, we included a 6-point response scale ranging from 1 (*strongly disagree*) to 6 (*strongly agree*). Coefficient alpha was .88 for the measure of team *mental efficacy* and .91 for the measure of team *physical efficacy*.

The items composing each measure of team efficacy are shown in the Appendix. For each measure, the items together represent a team's relatively inclusive impression of its capabilities as they pertain to adaptive functioning in response to complex challenges (either mental or physical). Each measure would seemingly prompt team members to consider (a) the supply (stock) and mix (variety) of the pertinent capabilities possessed by team members, (b) how well teammates can work together in combining their relevant resources, and (c) the anticipated task demands and constraints (see Gibson & Earley, 2007; Zaccaro et al., 1995).

Team internal social cohesion. We used Seers's (1989) four-item measure of social cohesion (e.g., "My team has a strong sense of togetherness") along with two additional items that we had written (i.e., "My team clearly has a unified spirit of excellence" and "My team is a very cohesive unit"). The response scale ranged from 1 (*strongly disagree*) to 6 (*strongly agree*). Coefficient alpha was .88.

To explore whether the three constructs measured through self-report were distinct, we conducted confirmatory factor analyses of the 14 items used to measure the two types of team efficacy along with the 6 items used to measure internal social cohesion. To account for parallel wording across the two team-efficacy measures, we correlated the error term for each of the seven pairs of corresponding items. We used three indices to assess model fit: root-mean-square error of approximation (RMSEA), comparative fit index (CFI), and Tucker–Lewis index (TLI). The proposed three-factor measurement model provided a good fit to the data, $\chi^2(160, N = 1{,}107) = 995.53$, $p < .001$; RMSEA = .07; CFI = .98; TLI = .97. We also examined an alternative (two-factor) model, in which we designated all 14 of the team-efficacy items as indicators of a single factor. This alternative model had a considerable increase in chi-square, along with other indicators of diminished model fit, $\Delta\chi^2(2, N = 1{,}107) = 1{,}879.33$, $p < .001$; RMSEA = .15; CFI = .93; TLI = .91. In sum, these analyses offer support for team mental efficacy and physical efficacy as distinguishable factors, despite the parallel wording used in measuring them.

Aggregating individual perceptions to the team level. We used intraclass correlation coefficients—ICC(1) and ICC(2)—to evaluate the appropriateness of aggregating individual-level scores to the team level (Bliese, 2000; Klein & Kozlowski, 2000; Mathieu & Schulze, 2006). The values of ICC(1) were .36 for team mental efficacy, .26 for team physical efficacy, and .40 for internal social cohesion, offering strong support for using team means (see Bliese, 2000). ICC(2) values also supported the use of team means, as they were .85 for team mental efficacy, .78 for team physical efficacy, and .87 for internal social cohesion.

Team Knowledge Pool: Aggregation of Team Members' Teamwork Knowledge

At the end of Week 2, team members completed a multiple-choice test that assessed their mastery of the transportable teamwork knowledge presented over the first 2 weeks of the ODP. Although scores on the teamwork-knowledge test were not posted, the observer for each team reported each member's score, to him or her, and reported the team average to the team. We used additive composition in that the average level of knowledge among team members represented the knowledge pool of a team. Team scores (means) ranged from 79.32 to 92.06 points.

Measures of Team Task Proficiency

For each of the three types of team tasks (described below), proficiency was recorded and reported in total for the episodes composing each type. The scores we obtained were in the form of the official record and were reported to us after teams completed the ODP.

Project X Phase 1 results. Each successfully accomplished task (of seven total tasks on Monday of Week 2) was worth 1 point. Team scores ranged from 1 to 7 points.

Project X Phase 2 results. Each successfully accomplished task (of seven total tasks on Tuesday of Week 4) was worth 1 point. Team scores ranged from 1 to 7 points.

Team problem solving results. Team proficiency on problem solving was a function of (a) whether each of the two problems was successfully solved (5 points each) and (b) the amount of time taken to solve a problem (e.g., 2 bonus points for being among the quickest 10% to complete a given task). Team scores ranged from 0 to 20 points.

Field operations results. Team proficiency on field operations was tallied as a function of (a) whether a team won each of its three field campaigns (4 points for a victory; 2 points for a tie) and (b) the margin of each victory (e.g., 6 bonus points for winning by a score margin of 10 or more). Team scores ranged from 3 to 29 points.

Measure of Observed Teamwork

Each team's observer assessed the teamwork of his or her team using the four-item measure described by Hirschfeld et al. (2006). This measure encompasses team effort, members' commitment to each other, members' active participation/interaction, and use of team resources. A behaviorally anchored rating scale that ranged from 1 (*extremely low*) to 6 (*extremely high*) was included. We averaged the four item ratings to compute an overall score. Coefficient alpha was .87, and team scores ranged from 1.50 to 6.00.

Results

Table 1 presents the descriptive statistics and correlations for the variables in this study. We used at least one multiple regression equation to test each hypothesis. For determining whether a given hypothesis was supported, we used an alpha of .05 (two-tailed). Because results for Project X Phase 1 had occurred before the two types of team efficacy were assessed, we controlled for these results in testing every hypothesis. Hypotheses 1–4 entail team mental efficacy and physical efficacy as outcomes of team attributes and initial team performance. Table 2 shows the results of the two regression equations that were used to test Hypotheses 1–4. For team *mental efficacy* as an outcome ($R^2 = .43$), number of team members ($\beta = .30$, $p < .001$) and Project X Phase 1 results

Table 1
Descriptive Statistics and Correlations

Variable	*M*	*SD*	1	2	3	4	5	6	7	8	9	10	11
Team composition													
1. No. of team members	13.73	0.59											
2. Proportion of team that is female	0.17	0.05	−.23										
Team knowledge pool													
3. Members' teamwork knowledge	86.45	2.44	−.05	−.23									
Types of team efficacy													
4. Team mental efficacy	4.77	0.51	.35	−.19	.15								
5. Team physical efficacy	4.66	0.45	.28	−.25	.01	.71							
Proficiency on team tasks													
6. Project X Phase 1 results	4.21	1.56	.06	−.15	.26	.57	.43						
7. Project X Phase 2 results	4.67	1.36	.14	−.04	.08	.26	.16	.37					
8. Problem solving results	10.21	5.20	.07	.00	.24	.22	.02	−.04	.05				
9. Field operations results	15.20	6.25	.05	−.19	.16	.07	.17	.05	.15	−.06			
Team social-process outcomes													
10. Internal social cohesion	4.77	0.56	−.02	−.18	.20	.47	.46	.30	.22	.14	.30		
11. Observed teamwork effectiveness	4.17	0.95	.08	−.10	.45	.43	.26	.30	.26	.26	.37	.51	

Note. $N = 110$ teams. Correlations of .19 or greater are significant at $p < .05$, two-tailed; correlations of .26 or greater are significant at $p < .01$, two-tailed.

($\beta = .54$, $p < .001$) were the only significant predictors. Likewise, for team *physical efficacy* as an outcome ($R^2 = .28$), number of team members ($\beta = .21$, $p = .02$) and Project X Phase 1 results ($\beta = .42$, $p < .001$) were the only statistically significant predictors. As such, Hypothesis 1 (team size) and Hypothesis 4 (initial team performance) were supported. In Hypothesis 2, it was predicted that female representation would be negatively related to team physical efficacy. Although the relevant coefficient was in the predicted direction ($\beta = -.17$, $p = .06$), it was not statistically significant at an alpha of .05. Similarly, results do not support team knowledge pool (Hypothesis 3) as a significant predictor of either team mental ($\beta = .02$, $p = .79$) or physical ($\beta = -.13$, $p = .16$) efficacy.

To examine each type of team efficacy as a unique predictor of subsequent outcomes, the other type was taken into account. Hypotheses 5a and 5b involve team mental and physical efficacy as differential contributors to team proficiency on commensurate tasks. To provide rigorous tests, we used regression equations that included team results on Project X Phase 1 and on the two remaining types of tasks. The results for Hypotheses 5a and 5b are reported in Table 3. We first examined results on Project X Phase 2 as an outcome; neither team mental efficacy nor physical efficacy was predictive, mainly because results on Phase 1 of Project X ($\beta = .38$, $p = .002$) were a strong predictor of Phase 2 results. Hypothesis 5a deals with team proficiency on tasks that primarily entail problem solving and decision making; we used team problem solving results as the criterion. Given that team mental efficacy ($\beta = .49$, $p = .001$) overshadowed team physical efficacy ($\beta = -.16$, $p = .23$) as a predictor, Hypothesis 5a was supported. Hypothesis 5b involves team proficiency on tasks that involve strenuous physical activity; we used field operations results as the criterion. As neither team physical efficacy ($\beta = .24$, $p = .09$) nor team mental efficacy ($\beta = -.09$, $p = .57$) was a significant predictor, Hypothesis 5b was not supported.

Table 2
Regression Analysis of Team Mental Efficacy and Physical Efficacy

	Mental efficacy			Physical efficacy		
Variable	R^2	β	*p*	R^2	β	*p*
Model	.43		<.001	.28		<.001
No. of team members		.30	<.001		.21	.02
Proportion of team that is female		−.04	.64		−.17	.06
Team knowledge pool		.02	.79		−.13	.16
Project X Phase 1 results		.54	<.001		.42	<.001

Note. $N = 110$ teams. Regression coefficients are standardized, and *p* values are two-tailed.

Hypothesis 6a deals with team mental efficacy and physical efficacy as unique contributors to team internal social cohesion. Results for the test of Hypothesis 6a are shown in Table 4; this hypothesis was supported in that team mental efficacy ($\beta = .32$, $p = .02$) and team physical efficacy ($\beta = .26$, $p = .03$) both contributed to greater internal social cohesion. Finally, Hypothesis 6b involves team mental efficacy and physical efficacy as unique contributors to observed teamwork effectiveness. Results for the test of Hypothesis 6b are also shown in Table 4; this hypothesis was partially supported in that team mental efficacy ($\beta = .28$, $p = .03$), but not team physical efficacy ($\beta = -.12$, $p = .28$), contributed to greater teamwork effectiveness.

Discussion

Overall, the results underscore team-level efficacy beliefs as important phenomena and support a distinction between mental efficacy and physical efficacy. Regarding inputs, findings suggest that teams' efficacy beliefs arise from much more than team composition (see Gibson & Earley, 2007), such that initial performance (results on Phase 1 of Project X) represented an early team-level experience that proved to be important for shaping both types of team efficacy. The median result for teams in Phase 1 of Project X was 4 of 7 tasks completed. This median success rate of

Table 3
Regression Analysis of Team Task Proficiency

Variable	Project X Phase 2			Problem solving			Field operations		
	R^2	β	*p*	R^2	β	*p*	R^2	β	*p*
Model	.18		.01	.19		.005	.11		.13
No. of team members		.12	.25		−.02	.86		−.02	.86
Proportion of team that is female		.05	.63		.05	.62		−.12	.23
Team knowledge pool		−.05	.63		.27	.007		.19	.07
Project X Phase 1 results		.38	.002		−.33	.006		−.13	.30
Team mental efficacy		.07	.63		.49	.001		−.09	.57
Team physical efficacy		−.10	.44		−.16	.23		.24	.09
Project X Phase 2 results					.06	.53		.17	.10
Problem solving results		.06	.53					−.10	.32
Field operations results		.16	.10		−.09	.32			

Note. $N = 110$ teams. Regression coefficients are standardized, and *p* values are two-tailed.

57% approximates the 50% success rate considered to be an optimal level of challenge for teams (Hackman, 2002). As such, for building true confidence among teams in their ability to generate effective action, there may be no substitute for authentic experiences of "enactive mastery" (Bandura, 1997, p. 80).

However, it is important to consider what may be done about those teams that do not attain initial mastery. For such cases, team leaders should recognize that team capability beliefs may be shaped over time by a host of team experiences, and they should respond by focusing team attention on what can be improved. In fact, it is possible for a single instance of failure to function as a source of effective feedback, which may enable a team to adjust its approaches so that it becomes better prepared for subsequent endeavors (Zaccaro et al., 1995). Accordingly, future research should examine interventions designed to build capability beliefs and promote improvement-oriented responses among teams that initially demonstrate a low level of performance.

Contrary to what we hypothesized, teams' female representation was not a significant predictor of team physical efficacy. Perhaps inasmuch as participants in our study had all met USAF physical conditioning standards, greater female representation was not seen as particularly disadvantageous to the physical performance of teams consisting of both male and female officers. Another possibility is that the culture surrounding the research setting may have mitigated the extent to which gender-associated schemata were manifested. That is, the USAF officer culture promotes gender equality, as supported by training, guidelines, and other consequential mechanisms (Hirschfeld, Jordan, Feild, Giles, & Armenakis, 2005). Another unanticipated finding was that neither type of team efficacy was predictable from team knowledge pool. This implies that team efficacy is based not on a team's stock of knowledge but rather on what the team thinks it will be able to do with its knowledge. However, an alternative explanation for the unexpected finding is that teams in our study lacked a good sense of their knowledge pools when reporting their efficacy beliefs.

Table 4
Regression Analysis of Outcomes Reflecting Team Processes

Variable	Internal cohesion			Observed teamwork		
	R^2	β	*p*	R^2	β	*p*
Model	.38		<.001	.50		<.001
No. of team members		−.23	.01		.04	.65
Proportion of team that is female		−.06	.51		.11	.18
Team knowledge pool		.08	.38		.30	<.001
Project X Phase 1 results		−.06	.60		.01	.89
Team mental efficacy		.32	.02		.28	.03
Team physical efficacy		.26	.03		−.12	.28
Project X Phase 2 results		.10	.25		.07	.38
Problem solving results		.07	.45		.10	.23
Field operations results		.21	.01		.25	.001
Internal social cohesion					.29	.002

Note. $N = 110$ teams. Regression coefficients are standardized, and *p* values are two-tailed.

Concerning outputs, the findings together reveal that team mental efficacy and physical efficacy each contributed uniquely to at least one indicator of team effectiveness. Whereas both types of team efficacy contributed to teams' internal social cohesion, it was mental efficacy that facilitated problem solving and observed teamwork effectiveness. Notably, the contributions of teams' mental and physical efficacy existed with a number of other factors taken into account, including Project X Phase 1 results and team knowledge pool.

Results involving team mental efficacy and physical efficacy as predictors suggest that these emergent states had an existence of their own. Otherwise, the team efficacy factors would not have contributed to aspects of team effectiveness with the results of Phase 1 of Project X taken into account. Likewise, team mental efficacy contributed to problem solving results and observed teamwork effectiveness in ways that were independent of team knowledge pool. These predictive contributions of team mental efficacy imply that it largely reflects a team's impression that it can configure unique intellectual contributions from among its individual members (see Hackman, 2002; Noe, Colquitt, Simmering, & Alvarez, 2003). Yet, there remains much to be discovered about how different types of team efficacy develop from a complex compilation of various considerations among team members (see Kozlowski & Klein, 2000).

It is plausible that team processes played a role in the patterns of relationships we have reported. For example, the overlap between

team mental efficacy and physical efficacy may have resulted from shared links to interpersonal processes (see Marks, Mathieu, & Zaccaro, 2001). However, a difference between mental and physical efficacy likely exists in the comparative relevance of some other team processes. Whereas team mental efficacy may be associated more closely with transition processes, team physical efficacy may be linked more closely with action processes (see Marks et al., 2001). Future research should explore team capability beliefs in conjunction with various team processes (Lester et al., 2002; Srivastava, Bartol, & Locke, 2006).

Although our study produced some meaningful results, it was not without limitations. For example, teams in the ODP were designed to be virtually equivalent in terms of their members' capabilities. Moreover, variation in team size was also minimal such that any curvilinear relationships involving team size could not have been observed (see Hackman, 2002, p. 117). The finding that neither type of team efficacy was a unique predictor of Project X Phase 2 results should be interpreted with caution, given concerns about "statistical overcontrol" (Bandura, 1997, p. 69) stemming from Project X Phase 1 results being taken into account. That is, correlations between prior and subsequent performance in the same endeavor likely reflect joint determinants, such as initial efficacy beliefs (which we were unable to measure).

Another potential limitation is that team observers were aware of their team's knowledge-test scores. If this awareness influenced observers' ratings of teamwork effectiveness, it could have inflated the relationship of team knowledge pool with observed teamwork effectiveness. Yet, this would have diminished the residual variance in observed teamwork effectiveness, thereby making it more difficult for the team-efficacy factors to explain incremental variance.

A final limitation is that we simply explored the explanatory roles of action teams' mental and physical efficacy in connection with various inputs and outcomes. That is, we did not intend to investigate a general theoretical model encompassing causal (or reciprocal) relationships among various sequential factors. For example, although we treated internal social cohesion and teamwork effectiveness as final outcomes, such factors are often regarded as predictors rather than outcomes of teams' task proficiency. Nevertheless, the emerging consensus about teams in organizations is that they are complex systems involving nonlinear, reciprocal, and perhaps conditional links among various team phenomena (Ilgen, Hollenbeck, Johnson, & Jundt, 2005). As such, our study was relatively straightforward in both its purpose and methodology.

In addition to our study's internal limitations, there are also issues of external relevance. A mental–physical categorization of team functions is relevant for teams beyond our research setting, as it essentially summarizes the activities for 10 of the 23 representative work teams listed by Sundstrom et al. (1990, p. 125). However, given that many teams do not perform physical tasks, the main functions on which team efficacy may focus would likely depend on the nature of the teams involved. As suggested by an anonymous reviewer, job analysis methods could provide a window into what team members might consider relevant in forming and organizing various efficacy perceptions about their team. One method is the Position Analysis Questionnaire (PAQ), which designates principal elements of worker behavior (Brannick, Levine, & Morgeson, 2007). As of 2004, the PAQ designates eight dimensions of how a job is carried out by incumbents.

Although the PAQ dimensions pertain to individual behavior, they may however be useful as initial bases for identifying various foci of team efficacy. For example, whereas *team mental efficacy* parallels the *mental processes* dimension of the PAQ, *team physical efficacy* parallels the *work output* (*physical activities*) dimension of the PAQ. Nevertheless, the breadth of the PAQ implies that additional categories of team efficacy may prove to be meaningful. As such, reasonable aims of future research might include formulating and testing multidimensional perspectives on team efficacy that extend beyond what we explored.

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Appendix

Items Composing the Measures of Team Efficacy

Team Mental Efficacy

My team has great confidence in itself to solve problems.

My team believes it can become unusually good at decision making.

In solving problems, my team expects to be known as a high-performing team.

My team feels it could solve any decision problem it encounters.

In decision making, my team believes it can be very productive.

In problem solving, my team is certain it can get a lot done when it works hard.

No decision problem is too tough for my team.

Team Physical Efficacy

My team has great confidence in itself to accomplish physical tasks.

My team believes it can become unusually good at physical tasks.

For physical tasks, my team expects to be known as a high-performing team.

My team feels it could overcome any physical challenge it encounters.

In physical tasks, my team believes it can be very productive.

For physical tasks, my team is certain it can get a lot done when it works hard.

No physical task is too tough for my team.

Note. Each item that was used to measure team mental efficacy had wording that corresponded directly to an item that was used to measure team physical efficacy. An inspection of interitem correlations revealed an expected wording effect. Across the two efficacy measures, the seven pairs of items with parallel wording had an average interitem correlation of .55. In comparison, the remaining 42 pairs of nonparallel items (across the two measures) had an average interitem correlation of .40. As such, the equivalent wording of items used across the measures inflated the correlation of scores on mental efficacy with those on physical efficacy. Within measures, the interitem correlations averaged .54 for team mental efficacy and .61 for team physical efficacy.

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